Hand Contracture Surgery: My Personal Experience

A layer-based strategy for durable motion

Betha Egih Riestiano, MD, Sp.BP-RE, Subsp.T(K)
Division of Plastic, Reconstructive and Aesthetic Surgery, Faculty of Medicine, Universitas Padjadjaran / Dr. Hasan Sadikin General Hospital, Bandung, Indonesia

BACKGROUND

Hand contractures following burns, trauma, infection, or previous surgery may involve the skin, web spaces, tendons, joint capsule, ligaments, and bone. Treating only the visible scar risks incomplete correction, unstable coverage, impaired tendon glide, and recurrent deformity.

OBJECTIVE

To present an experience-based, layer-oriented operative strategy for hand contracture surgery, emphasizing mechanical diagnosis, sequential release, appropriate resurfacing, and rehabilitation planning.

SURGICAL STRATEGY

The preoperative assessment prioritizes the active-passive motion gap, total active motion, fingertip-to-palm distance, tendon excursion, intrinsic tightness, joint stability, first-web opening, sensibility, perfusion, scar quality, and the patient's functional goal. The operative sequence follows five steps: **diagnose, release, reassess, resurface, and rehabilitate**. Release proceeds from superficial to deeper structures, with repeated assessment of passive motion and tendon glide while preserving neurovascular bundles, pulleys, paratenon, and joint stability. Coverage is selected only after the true defect is created. Z-plasty or local rearrangement is suitable for selected linear bands; full-thickness grafting is useful for broad skin deficits with a healthy vascular bed; and vascularized tissue is preferred when tendons, joints, bone, or neurovascular structures are exposed, or when a recurrent scarred field requires durable gliding tissue.

PRACTICAL LESSONS

Three recurring patterns illustrate this approach. Dorsal contractures require restoration of an extensor gliding surface rather than wound closure alone. First-web contractures create a three-dimensional defect whose reconstruction must restore abduction, opposition, pinch, and commissural depth. PIP flexion contractures require progressive release of skin, tendon adhesions, and only the capsuloligamentous structures that remain demonstrably tight. Rehabilitation and orthotic goals are defined before closure. Recurrence should trigger renewed classification of the unresolved cutaneous, tendinous, articular, skeletal, biological, or rehabilitation-related cause before revision surgery.

CONCLUSION

Durable correction is achieved through four linked principles: **Release, Resurface, Rebalance, and Retain**. The aim is not maximal intraoperative correction at any cost, but a safe functional gain supported by stable coverage, preserved biomechanics, structured rehabilitation, and long-term scar control.

Keywords: hand contracture; post-burn reconstruction; contracture release; skin graft; flap; tenolysis; first web space; hand rehabilitation

SELECTED REFERENCES

1. Vosinakis C, et al. Effectiveness of hand reconstruction techniques for postburn contractures of the hand: a systematic review. Burns. 2024;50:107281.
2. Wallace DR, Floyd W. Operative First Web Contracture Management: Current Strategies. JBJS Open Access. 2024;9.
3. Elemosho A, et al. Outcomes of Microsurgical Reconstruction of Post-Burn Joint Contracture: Systematic Review and Meta-Analysis. Microsurgery. 2025;45.
4. Kim K, et al. Definition and measurement of functional first web space: a scoping review. Hand Therapy. 2025;31:3-12.
5. Zuo K, et al. Outcomes of Secondary Combined PIP Joint Release and Zone II Flexor Tenolysis. HAND. 2020;15:502-508.
6. Mavilakandy A, et al. Combination triamcinolone and 5-fluorouracil versus monotherapy for hypertrophic scars: systematic review and meta-analysis. Plast Reconstr Surg. 2023;153:1318-1330.